

The boundary between wetland and deepwater habitat in the Marine and Estuarine Systems coincides with the elevation of the extreme low water of spring tide; permanently flooded areas are considered deepwater habitats in these Systems. The boundary between wetland and deepwater habitat in the Riverine and Lacustrine Systems lies at a depth of 2 m (6.6 feet) below low water; however, if emergents, shrubs, or trees grow beyond this depth at any time, their deepwater edge is the boundary.

The 2-m lower limit for inland wetlands was selected because it represents the maximum depth to which emergent plants normally grow (Welch 1952; Zhadin and Gerd 1963; Sculthorpe 1967). As Daubenmire (1968:138) stated, emergents are not true aquatic plants, but are "amphibious," growing in both permanently flooded and wet, nonflooded soils. In their wetland classification for Canada, Zoltai et al. (1975) also included only areas with water less than 2 m deep.

THE CLASSIFICATION SYSTEM

The structure of this classification is hierarchical, progressing from Systems and Subsystems, at the most general levels, to Classes, Subclasses, and Dominance Types. Figure 1 illustrates the classification structure to the class level. Table 1 lists the Classes and Subclasses for each System and Subsystem. Artificial keys to the Systems and Classes are given in Appendix E. Modifiers for water regime, water chemistry, and soils are applied to Classes, Subclasses, and Dominance Types. Special modifiers describe wetlands and deepwater habitats that have been either created or highly modified by man or beavers.

Hierarchical Structure

Systems and Subsystems

The term **SYSTEM** refers here to a complex of wetlands and deepwater habitats that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors. We further subdivide Systems into more specific categories called **SUBSYSTEMS**.

The characteristics of the five major Systems—Marine, Estuarine, Riverine, Lacustrine, and Palustrine—have been discussed at length in the scientific literature and the concepts are well recognized; however, there is frequent disagreement as to which attributes should be used to bound the Systems in space. For example, both the limit of tidal influence and the limit of ocean-derived salinity have been proposed for bounding the upstream end of the

Estuarine System (Caspers 1967). As Bormann and Likens (1969) pointed out, boundaries of ecosystems are defined to meet practical needs.

Marine System

Definition. The Marine System (Fig. 2) consists of the open ocean overlying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean and the water regimes are determined primarily by the ebb and flow of oceanic tides. Salinities exceed 30‰, with little or no dilution except outside the mouths of estuaries. Shallow coastal indentations or bays without appreciable freshwater inflow, and coasts with exposed rocky islands that provide the mainland with little or no shelter from wind and waves, are also considered part of the Marine System because they generally support typical marine biota.

Limits. The Marine System extends from the outer edge of the continental shelf shoreward to one of three lines: (1) the landward limit of tidal inundation (extreme high water of spring tides), including the splash zone from breaking waves; (2) the seaward limit of wetland emergents, trees, or shrubs; or (3) the seaward limit of the Estuarine System, where this limit is determined by factors other than vegetation. Deepwater habitats lying beyond the seaward limit of the Marine System are outside the scope of this classification system.

Description. The distribution of plants and animals in the Marine System primarily reflects differences in four factors: (1) degree of exposure of the site to waves; (2) texture and physicochemical nature of the substrate; (3) amplitude of the tides; and (4) latitude, which governs water temperature, the intensity and duration of solar radiation, and the presence or absence of ice.

Subsystems.

Subtidal.—The substrate is continuously submerged.

Intertidal.—The substrate is exposed and flooded by tides; includes the associated splash zone.

Classes. Rock Bottom, Unconsolidated Bottom, Aquatic Bed, Reef, Rocky Shore, and Unconsolidated Shore.

Estuarine System

Definition. The Estuarine System (Fig. 3) consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semiencllosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Offshore areas with typical estuarine plants and animals, such as red mangroves (*Rhizophora*

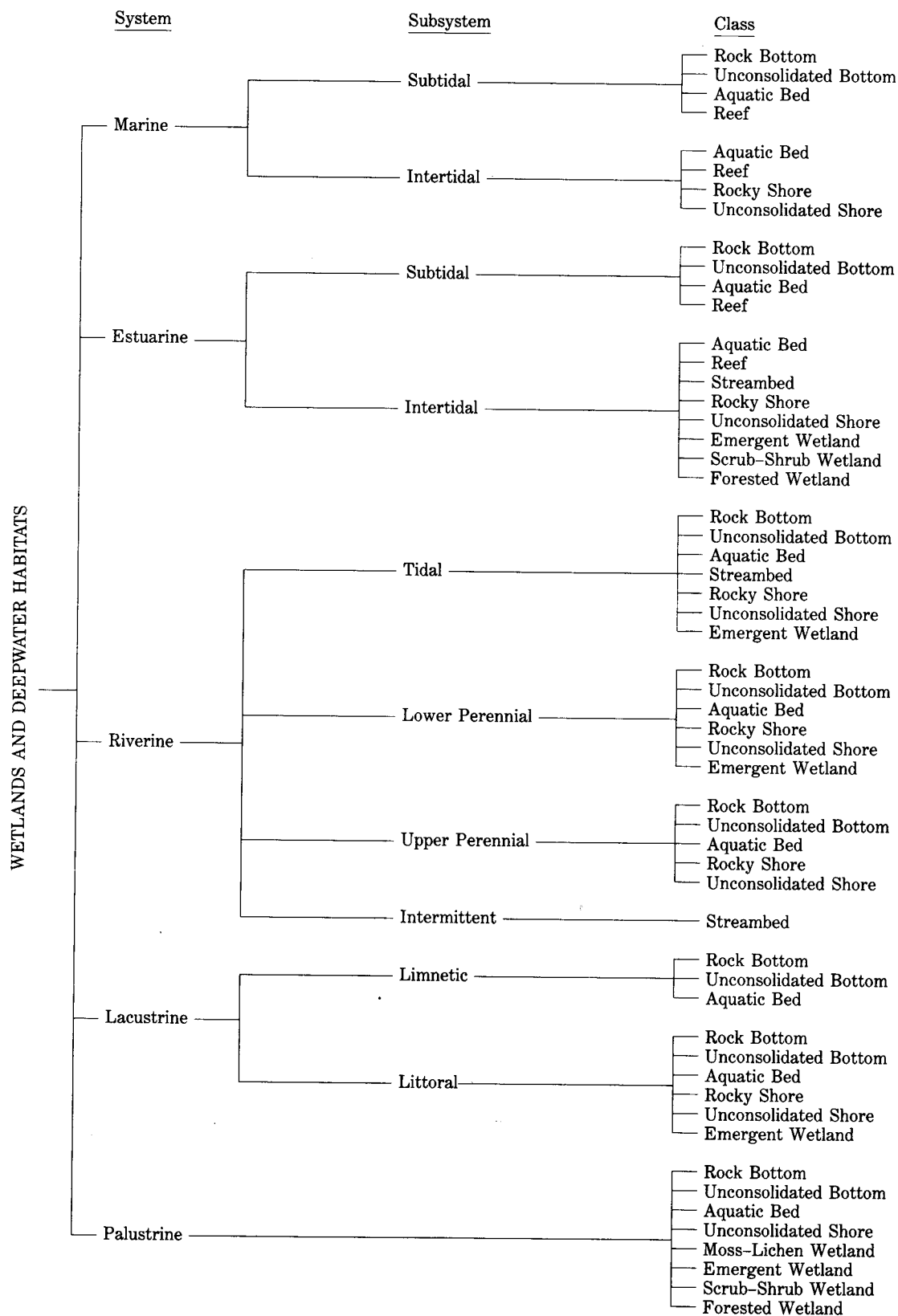


Fig. 1. Classification hierarchy of wetlands and deepwater habitats, showing Systems, Subsystems, and Classes. The Palustrine System does not include deepwater habitats.

Table 1. *Distribution of Subclasses within the classification hierarchy.*

Class/Subclass	System and Subsystem ^a									
	Marine		Estuarine		Riverine				Lacustrine	
	ST	IT	ST	IT	TI	LP	UP	IN	LM	LT
Rock Bottom										
Bedrock	X		X		X		X		X	X
Rubble	X		X		X		X		X	X
Unconsolidated Bottom										
Cobble-Gravel	X		X		X	X	X		X	X
Sand	X		X		X	X	X		X	X
Mud	X		X		X	X	X		X	X
Organic			X		X	X			X	X
Aquatic Bed										
Algal	X	X	X	X	X	X	X		X	X
Aquatic Moss					X	X	X		X	X
Rooted Vascular	X	X	X	X	X	X	X		X	X
Floating Vascular			X	X	X	X	X		X	X
Reef										
Coral	X	X								
Mollusk			X	X						
Worm	X	X	X	X						
Streambed										
Bedrock				X	X			X		
Rubble				X	X			X		
Cobble-Gravel				X	X			X		
Sand				X	X			X		
Mud				X	X			X		
Organic				X	X			X		
Vegetated								X		
Rocky Shore										
Bedrock		X		X	X	X	X		X	
Rubble		X		X	X	X	X		X	
Unconsolidated Shore										
Cobble-Gravel		X		X	X	X	X		X	X
Sand		X		X	X	X	X		X	X
Mud		X		X	X	X	X		X	X
Organic		X		X	X	X	X		X	X
Vegetated					X	X	X		X	X
Moss-Lichen Wetland										
Moss										X
Lichen										X
Emergent Wetland										
Persistent				X						X
Nonpersistent				X	X	X	X		X	X
Scrub-Shrub Wetland										
Broad-leaved Deciduous				X						X
Needle-leaved Deciduous				X						X
Broad-leaved Evergreen				X						X
Needle-leaved Evergreen				X						X
Dead				X						X